Notes on Penguins of the Genera *Megadyptes* and *Eudyptes* in Southern New Zealand.

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In examining a collection of birds from Stewart Island and South-west Otago it was found that one or two additions and corrections could be made to the existing literature of the penguins of that region. Comparative study of specimens in the Otago, Canterbury and Dominion Museums has been made by courtesy of Dr. W. B. Benham, Professor R. Speight, and Dr. W. R. B. Oliver. The field observations recorded were made during a visit to Stewart Island in October and November, 1934, as guest of Captain G. M. Turner, and a subsequent visit to the West Coast Sounds in the N.Z.G.S. "Matai," by courtesy of the Hon. Minister for Marine.

Megadyptes antipodes (H. & J.).

Material examined: Skins and eggs in the Auckland Museum.

No.	Sex.	Locality.	Date.	Flipper.	Tail.	Tarsus.	Toe.	Culmen.
A.M. 120.1	♂	Stewart I.		200	50	33	79	59 mm.
120.2	♂ imm.	Stewart I.		205	62	32	83	56 mm.
120.3	—	Stewart I.		210	55	30	81	56 mm.
120.7	♀	Stewart I.	28/10/34	200	58	34	83	54 mm.
120.8	♀	Stewart I.	20/2/35	195	63	35	77	54 mm.
120.9	immat.	Stewart I.	20/2/35	194	65	31	85	53 mm.
120.5	chick	Stewart I.	12/12/32					

The uniformity of size in birds from Stewart Island is indicated above and confirmed by the examination of a large series in the Dominion Museum from the same locality, but without other data. Apparently the bill in males is slightly longer than in females. Adult birds show no variation in plumage except for the occurrence of a few white feathers in the upper tail coverts of some, a feature that occurs in several other species. In the flesh the feet are fleshy white and the iris honey yellow (Ridgway's Standards). The bill colouration is correctly depicted by Wilson (1907, pl. XI.), but the plumage pattern of the crown of the adult and appearance of the eye in life are better indicated by the accompanying photograph of an adult bird at Stewart Island. (Pl. 74, fig. 2.)

The full egg clutch is invariably two, of about equal size, and generally not much variation is shown in a series from one locality. The following measurements are from specimens in the Auckland Museum:—

Clutch No.	Locality.	Date.	Size.
1	Stewart Island	27th October, 1934	(a) 76 x 55 mm. (b) 75 x 55.5 mm.
2	Stewart Island	October, 1911	(a) 74 x 55.5 mm. (b) 75 x 55.5 mm.
3	Stewart Island	October, 1911	(a) 74.5 x 55.5 mm. (b) 76 x 56.5 mm.
4	Stewart Island	1st November, 1911	(a) 75.5 x 51 mm. (b) 80 x 50 mm.

The smaller, narrower eggs of clutch number 4 show irregularities of shell texture that suggest abnormality. The earliest laying date recorded is 22nd September, noted by Guthrie-Smith (1914, p. 61). This accords with the advanced stage of incubation of eggs found by us on 27th October, 1934, near Half Moon Bay, where subsequently Mr. R. H. Traill found eggs hatching on 6th November. A period of incubation of six weeks or longer seems to be indicated.

Nestling plumages have not been described. A well-grown chick in secondary down was collected at Stewart Island by Mr. E. F. Stead on 12th December, 1932. The bird weighed 2 lbs. 12 ozs. in the flesh, and was 43 cms. long from bill to tail. Bill pinkish brown, iris yellowish hazel, feet fleshy white above and black below. The entire coat of down is hair-brown in colour, slightly longer on the back, but generally short, dense and furry. In appearance and texture it is not unlike that of a half-grown chick of *Aptenodytes patagonica.*

The first teleoptyle plumage has been somewhat briefly described by authors. It is represented in the above series by No. 120.9, a bird taken in March, shortly after losing its down. Its dimensions are practically those of an adult bird, and the colours of the soft parts were only slightly duller than adult colouration. Its weight was 9 lbs. The plumage of the coronal area is interesting. In the adult this area consists of elongated feathers which are straw yellow with broad black shaft lines, the area being bounded posteriorly by the band of clear yellow feathers. In the first plumage the black-shafted pale yellow feathers occur only in the superciliary region, running from the nasal angle of the bill above and behind the eye. The central feathers of the crown are the same colour as the back, bluish with black shafts, and the continuity of this colour is not broken by any band behind the crown. The white of the breast plumage continues unbroken along the mid-line of throat and chin. The white strip leading from the breast on to the fore-edge of the flipper is slightly interrupted by a few small dark feathers which are

not present in adults. The pale yellow tinge about the gape and the golden brown cheek of the adult plumage are present also in the first plumage.

Distribution and Habits:—The northern limit of the breeding range of the yellow-eyed penguin is the south side of Otago Peninsula, where there are still small colonies. The birds also nest in suitable localities at and about Nugget Point. On the east coast of Stewart Island and the "mutton bird" archipelago off Half Moon Bay this is an abundant species. Nests are usually to be found in the fringe of forest or scrub that runs down to stretches of coast that front the open sea and yet are not exposed to prevailing wind and sea. Under such conditions we found them along the ocean beach at The Neck, on the north side of the entrance to Paterson Inlet, and at Bench Island and Bunker's Island. On the west coast some were nesting on the more sheltered and less precipitous sides of the two Ernest Islands, south of Mason's Bay, while Mr. E. F. Stead has found them at the South Cape Islands, and also at Codfish Island. These nesting groups are in no strict sense of the term "colonies," but are due to suitable nesting conditions in one area being available for more than one pair. Otherwise the pairs are entirely independent and solitary, and in some places only one pair seem to be established.

It has been stated by Guthrie-Smith (1914, p. 59) that the birds "avoid stretches of soft sand and shingle as particularly irksome to a bird whose method of progression is by hopping." While this may be true of the birds' preferences it is somewhat misleading. At Ocean Beach, on the seaward side of "the Neck," we saw fifteen pairs of tracks crossing fifty yards of sandy beach and two lines of dunes before the bush was reached, and frequently watched the birds crossing the area with a rapid waddling walk. As compared with the various rock-hopping *Eudyptes, Megadyptes* is quite a good "walker" after the fashion of *Pygoscelis papua* and *Aptenodytes patagonica.*

About a dozen nests were examined, and all contained the uniform pairs of much discoloured eggs. Situations varied from the hollows between the buttresses of rata trunks to places in the undergrowth shaded only by *Blechnum* fern (Pl. 74, fig. 1). Both sexes were found sitting, with the partner often standing in the scrub near by. The sitting birds were invariably in the recumbent position shown in Plate 74, fig. 1. There would seem to be little mortality during nesting, and both chicks are usually reared. The moult of adults begins in March, when the young have already taken to the sea and begun to feed themselves. An adult ready to moult (March, 1935) weighed 14 lbs.

Mr. John Wesley, of Half Moon Bay, assures me that this bird is known to Stewart Island natives as "Tawaki," which may therefore be a generic name for the larger penguins, as it is applied also to *Eudyptes pachyrhynchus.*

Eudyptes pachyrhynchus pachyrhynchus Gray.

Material examined:—Skins, eggs and skeletons in the Auckland, Canterbury and Dominion Museums.

No.	Sex.	Locality.	Date.	Flipper.	Tail.	Tarsus.	Toe.	Culmen.	Depth of Bill.
A.M. 122.1	♂	Otago Peninsula	—	179	—	27	77	54	(23)
122.15	♀	Puysegur Point	13/11/34	185	—	28	68	45	(21)
122.16	♀	Puysegur Point	13/11/34	183	73	29	69	47	(20.5)
122.17	♀	Puysegur Point	13/11/34	180	69	26	70	49	(22)
122.18	♀	George Sound	21/11/34	180	66	27	67	51	(22)
122.20	Skel.	Mason's Bay, Stewart Is.	—					44	(22)
122.14	♂ imm.	Karekare, N.Z.	16/10/30	190	85	24	80	55	(23)
C.M. 1029.5	♀	Otago	1892	180	—	30	64	49	(23)
A.M. 122.3	Chick	Dusky Sound	Sept., 1884						

The variation in size, especially of the bill in this species, has been remarked upon by various authors. It is probably not so great as indicated by Buller (1905, p. 89), for he included specimens from Snares, which are here regarded, for reasons given below, as a separable race. The specimens described above from Puysegur Point and George Sound are unfortunately all females, but it will be noted that two males, including a young one, from other localities have larger bills. From observation of mated pairs at Puysegur Point it would seem that this is generally the case. The colours of the soft parts are correctly given by Buller (1888, p. 287). The iris, which he describes as "brick-red," is in fact the "mineral red" of Ridgway's Standards. The superciliary yellow crests are not entirely drooping in life (Pl. 75, fig. 1). The upper feathers project straight behind and the lower ones droop away somewhat as in *E. cristatus*. This arrangement is evidently controlled by muscles, for it is usually not apparent in preserved skins. The pale patches sometimes seen on the cheeks and throats of adults are simply due to a disturbance of the feathers, showing their white bases. The white bases of throat feathers in this species serve as a useful additional means of distinguishing it from *E. sclateri* and *E. cristatus*, in which the bases of the feathers are grey. The progress to maturity has been described by Sutherland (1923, pp. 35-38), but as he mentions colour change without reference to the nature of the plumage—whether primary or secondary down—the description of the downy plumages is somewhat obscure. A chick in the Auckland Museum, collected by Reischek in September, 1884, at Dusky Sound is faded but has the colour pattern shown in Sutherland's plate (1920, p. 77) of a ten-day old chick.

No. 122.14 (Pl. 75, fig. 2), a young male about a year old, was picked up on 16th October, 1930, on a North Island beach about seven hundred miles north of the nearest known breeding colony.

It was in good condition, but thin, and had only a few cephalopod beaks in the stomach. The feathers of forehead and crown are edged with blue grey and not elongate and black, as in the adult. The incipient yellow crests are visible for their entire length, projecting slightly behind, but ill defined, as most of the yellow feathers are tipped with black. Iris brown, bill reddish brown, feet flesh pink above, black on outer edge of webs and beneath.

Distribution and Habits:—The crested penguin was abundant around the coast from Preservation Inlet to Martin's Bay in November, 1934. Nesting colonies were found at Sealers' Bay, Puysegur Point, Coal Island (all in Preservation Inlet region), Dusky Sound, George Sound, and at Anita Bay and Harrison Cove in Milford Sound. At night the braying and squealing of birds ashore could be heard at all the anchorages, and schools of twenty and thirty birds were frequently seen "porpoising" offshore by day. It is difficult to form an estimate of the penguin population or the size of colonies owing to the peculiar situations of the nests. Accessible cave colonies have been found by resident observers, but all the colonies we came across were inaccessible, and the young could only have been caught by a dog. Some were under the large boulders piled up along the shore, but many nesting birds had travelled inland up the wooded gullies to a distance of half a mile and were nesting in tunnels and cavities underground. These subterranean tunnels were formed partly by the spreading roots of trees, and had been enlarged by traffic and burrowing. Many were moist and muddy. Here and there young birds, well-grown but still in down, were seen standing at the entrances, but they always avoided capture by retreating out of reach. Adults coming to and from the sea were met with on the well worn tracks throughout the day. A pair of adults observed on the foreshore at Puysegur Point on 13th November were engaged in ablutions, standing in ten inches of water in a rock pool and, with feathers raised, rinsing themselves thoroughly. The well-known biting sandflies *(Simuliidae)* of these regions are a source of great annoyance to the birds, and their attacks, which are made only in sunshine, prevent the birds from standing about in the open. The prevalence of these insects in the Sounds region is probably one of the causes of the subterranean nesting of the penguins there.

The nesting season had evidently begun, as recorded by Reischek and Sutherland, in July, and the young that we saw would be ready to take to the water by early December. Sutherland (1920, p. 77) records a second laying in December in a cave colony in which nesting began in July. It remains to be determined, however, whether the same individual adults nest twice in a season. The November adults seen by us were beginning to look the worse for wear, and Sutherland remarks on the "grand condition" of the birds found sitting on 13th December, so that they were possibly a late breeding section.

Eudyptes pachyrhynchus atratus Hutton.

Material examined:—One adult skin in the collection of the Canterbury Museum, of which the particulars are:—

C.M. 1029.6 ♀, Snares Islands, 1892, Buller Collection. Dimensions: Flipper 220, tail 90, tarsus 36, middle toe and claw 64, bill length 63, depth closed bill 30 mm. It has been customary to include the crested penguin inhabiting the Snares in the category of *Eudyptes pachyrhynchus* Gray, but a consideration of the marked differences in habits suggested that a critical examination of specimens would disclose some characters separating it from the typical mainland form. From examination of the only localised specimen available, described above, the Snares Island bird appears to be of greater dimensions, especially in the size of the bill. The difference is admirably shown in Buller's plate (1905, p. 89) of two adult females which he used to demonstrate the supposed variation of bill size in the species. The upper figure appears to be of the identical specimen, now in the Canterbury Museum, described above. Although other specimens from the Snares are not available, the many published photographs of the rookeries there show the thick, heavy bill to be a constant character. The specific name *atratus* has been applied by Hutton (1875, p. 114) to a melanistic specimen from the Snares, and is now available for the race from those islands. Although the type has been lost (Oliver, 1930, p. 73), there is little doubt that the bird belonged to the form of *E. pachyrhynchus* breeding there. The possibility of Hutton's bird having been a stray *E. schlegeli* has been considered, but ruled out, as the figure (Buller, 1888, vol. II., pl. XLVI.) shows the crest to be of the *pachyrhynchus* form. Hutton, in the original description, remarks on the large size of the bill. A skeleton picked up at Mason's Bay, Stewart Island, in November, 1934, is possibly referable to this form. The bill dimensions are length 57 mm., depth when closed 29 mm.

Eggs from the Snares show a considerable range of variation in size and shape, but all those available have been collected in a haphazard way and are not of much record value. Particulars of three are:—

1. 9th October, 1906. 77 x 55.5 (G. Buddle Collection, Auck. Mus.).
2. No date. 72.5 x 55.5 (G. Buddle Collection, Auck. Mus.).
3. September, 1886. 66.5 x 54 (J. C. McLean Collection, Auck. Mus.).

As usual in penguins' eggs, the variation in diameter is much less than that of the axis, due probably to the uniformity of the oviduct in any species. The eggs in the G. Buddle collection are marked as having been "clutch of one," but photographs of rookeries show two eggs in some nests.

Habits:—Two respects in which the Snares crested penguin appears to differ from the mainland form are in situation of nests, and date of breeding. Regarding the former, all observers' accounts and their photographs indicate the formation of large

colonies of birds in the open, in clearings amongst the scrub. This is in contrast with the subterranean habits of the mainland bird. The breeding season is fully a month later at the Snares. Oliver (1930, p. 74) quotes Captain Bollons as stating that the birds commence laying in September, and there is a September egg in the above series. E. R. Waite (in the "Weekly Press" of 27th February, 1907) states that on 31st January, 1907, at the Snares, the parent birds were tending their young ones, which were then losing their down. These young would therefore be fully feathered in February, and the old birds would moult in March, as they have been reported to do by Archey (1923, p. 119).

Eudyptes sclateri Buller.

Although not known to breed nearer than Antipodes and Bounty Islands, birds of this species are washed ashore on New Zealand beaches much more frequently than has been recorded. The Otago, Canterbury and Dominion Museums all possess series obtained from the beaches adjacent to Dunedin, Christchurch and Wellington, and all obtained over a period of years during the months of May, June and July. As these are the months during which the birds are absent from their breeding stations, it seems likely that *E. sclateri* spends the winter at sea in the coastal waters of New Zealand to the north of its breeding grounds.

In discussing the features distinguishing this species from *E. pachyrhynchus,* Ogilvie-Grant (1898, p. 641) considers the form of the bill to be a more reliable character than the position of the yellow eyebrow-stripe. Buller (1905, p. 89) takes the opposite view that the crest is constant and the bill varies. The series examined by the writer show both tendencies. The eyebrow stripe in some *E. sclateri* is continued indistinctly towards the nasal opening, and the culminicorn in some *E. pachyrhynchus,* viewed from above, tends to the parallel pattern of *E. sclateri.* There is, however, no evidence of intergradation in the series examined, and the species are undoubtedly distinct. The fact that the bases of the throat feathers are pure white in *E. pachyrhynchus* and grey to blackish in *E. sclateri* is another good character. *E. sclateri* has been described (Oliver, 1930, p. 75) as a larger species than *E. pachyrhynchus.* Although slightly larger than the mainland form of that species, it does not usually equal the dimensions of the Snares form.

Odd black feathers occur in the breast plumage of two of the series of *E. sclateri,* and Miss D. Hancock, of Dunedin, has shown me photographs of a melanistic individual which wandered ashore at St. Kilda Beach in the winter of 1934. The bird appears to be entirely black except for the crest, which is normal. Melanism has now been recorded in all the species of crested penguins *(Eudyptes* and *Catadyptes)* endemic in the New Zealand region.

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Fig. 1. *Megadyptes antipodes* on nest amongst forest undergrowth.

Fig. 2. Head of *Megadyptes antipodes*, adult, from life.

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Fig. 1. *Eudyptes pachyrhynchus pachyrhynchus,* adult male, Puysegur Point.

Fig. 2. Head of *Eudyptes pachyrhynchus,* immature (Auckland Museum, No. 122.14).